

**U.S. Census Bureau Urban Areas**  
**Climate Change Atlas Tree Species**  
 Current and Potential Future Habitat, Capability, and Migration

	sq. km	sq. mi	FIA Plots
Area of Region	8,800.0	3,397.7	168

**Species Information**

The columns below provide brief summaries of the species associated with the region and described in the table on the next pages. Definitions are provided in the Excel file for this region.

Genus	Species	Abundance		Model		Potential Change in Habitat Suitability		Capability to Cope or Persist		Migration Potential					
				Reliability	Adaptability	Scenario RCP45	Scenario RCP85	Scenario RCP45	Scenario RCP85	SHIFT RCP45	SHIFT RCP85				
Ash	3			High	18	24	Increase	27	32	Very Good	10	17	Likely	3	3
Hickory	5			Medium	27	42	No Change	9	6	Good	20	15	Infill	7	8
Maple	4	Abundant	3	Low	31	11	Decrease	23	21	Fair	9	9	Migrate	3	6
Oak	15	Common	31	FIA	3		New	13	14	Poor	9	9			
Pine	2	Rare	28				Unknown	7	6	Very Poor	9	7			
Other	33	Absent	16							FIA Only	1	1			
	<b>62</b>		<b>78</b>		<b>79</b>	<b>77</b>		<b>79</b>	<b>79</b>	Unknown	4	3			
											<b>62</b>	<b>61</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	57.8	59.6	61.9	62.2	
	CCSM85	57.8	60.0	62.8	65.9	
	GFDL45	57.8	61.5	62.8	63.6	
	GFDL85	57.8	60.5	63.9	67.4	
	HAD45	57.8	60.4	63.7	65.0	
HAD85	57.8	60.9	65.5	69.4		
Growing Season May—Sep	CCSM45	73.3	75.0	77.0	77.6	
	CCSM85	73.3	75.4	78.4	82.3	
	GFDL45	73.3	77.6	79.0	80.3	
	GFDL85	73.3	76.5	80.5	84.7	
	HAD45	73.3	76.6	79.9	81.4	
HAD85	73.3	77.1	83.7	87.3		
Coldest Month Average	CCSM45	33.9	35.7	37.3	37.6	
	CCSM85	33.9	37.1	38.2	39.9	
	GFDL45	33.9	37.7	37.6	37.9	
	GFDL85	33.9	35.4	36.6	37.1	
	HAD45	33.9	34.6	36.9	37.2	
HAD85	33.9	35.9	37.8	39.5		
Warmest Month Average	CCSM45	78.6	80.2	81.4	81.6	
	CCSM85	78.6	80.7	82.4	84.2	
	GFDL45	78.6	81.9	83.2	84.1	
	GFDL85	78.6	81.9	84.2	86.6	
	HAD45	78.6	83.0	85.7	86.3	
HAD85	78.6	84.7	89.3	90.8		

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	49.9	50.6	56.3	54.7	
	CCSM85	49.9	55.5	55.6	59.1	
	GFDL45	49.9	57.1	60.4	62.8	
	GFDL85	49.9	57.2	61.2	64.8	
	HAD45	49.9	48.0	51.9	52.1	
HAD85	49.9	49.8	46.9	51.9		
Growing Season May—Sep	CCSM45	20.3	19.2	20.6	20.1	
	CCSM85	20.3	21.3	18.8	20.2	
	GFDL45	20.3	23.2	23.7	24.5	
	GFDL85	20.3	23.3	24.0	24.9	
	HAD45	20.3	18.8	18.0	18.0	
HAD85	20.3	19.3	15.0	15.8		

**NOTE:** For the six climate variables, four 30-year periods are used to indicate six potential future trajectories. The period ending in 2009 is based on modeled observations from the PRISM Climate Group and the three future periods were obtained from the NASA NEX-DCP30 dataset. Future climate projections from three models under two emission scenarios show estimates of each climate variable within the region. The three models are CCSM4, GFDL CM3, and HadGEM2-ES and the emission scenarios are the 4.5 and 8.5 RCP. The average value for the region is reported, even though locations within the region may vary substantially based on latitude, elevation, land-use, or other factors.

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Current and Potential Future Habitat, Capability, and Migration

Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
sugar maple	Acer saccharum	WDH	High	70.5	712.8	11.5	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
white oak	Quercus alba	WDH	Medium	59.1	640.9	11.7	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	2
yellow-poplar	Liriodendron tulipifera	WDH	High	64.8	637.5	11.6	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	3
pignut hickory	Carya glabra	WDL	Medium	55.7	416.4	8.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	4
black cherry	Prunus serotina	WDL	Medium	50	328.3	8.3	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	5
eastern redcedar	Juniperus virginiana	WDH	Medium	58	273.5	6.7	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	6
black oak	Quercus velutina	WDH	High	50	250.4	5.7	No change	No change	Medium	Common	Fair	Fair			1	7
sassafras	Sassafras albidum	WSL	Low	61.4	246.9	5.4	Lg. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	8
American beech	Fagus grandifolia	WDL	High	53.4	230.7	5.8	Lg. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	9
winged elm	Ulmus alata	WDL	Medium	63.6	224.8	5.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	10
blackgum	Nyssa sylvatica	WDL	Medium	61.4	217.5	4.6	No change	Sm. inc.	High	Common	Good	Very Good			1	11
red maple	Acer rubrum	WDH	High	27.3	200.3	9.5	No change	Sm. inc.	High	Common	Good	Very Good			1	12
sweetgum	Liquidambar styraciflua	WDH	High	36.4	193.7	6.5	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	13
southern red oak	Quercus falcata	WDL	Medium	42	189.1	7.4	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	14
post oak	Quercus stellata	WDH	High	36.4	177.1	5.8	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	15
mockernut hickory	Carya alba	WDL	Medium	48.9	174.2	5.5	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	16
green ash	Fraxinus pennsylvanica	WSH	Low	51.1	152.2	4.6	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	17
American elm	Ulmus americana	WDH	Medium	42	140.8	4.3	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	18
loblolly pine	Pinus taeda	WDH	High	8	130.1	15.4	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good	Infill ++	Infill ++	1	19
shagbark hickory	Carya ovata	WSL	Medium	50	122.7	3.6	No change	No change	Medium	Common	Fair	Fair			1	20
northern red oak	Quercus rubra	WDH	Medium	35.2	120.3	4.1	No change	No change	High	Common	Good	Good			1	21
flowering dogwood	Cornus florida	WDL	Medium	43.2	115.5	2.8	No change	No change	Medium	Common	Fair	Fair			1	22
common persimmon	Diospyros virginiana	NSL	Low	35.2	112.7	4.5	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	23
chestnut oak	Quercus prinus	NDH	High	14.8	109.4	9.2	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	1	24
sycamore	Platanus occidentalis	NSL	Low	35.2	108.6	4.2	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	25
boxelder	Acer negundo	WSH	Low	28.4	102.2	6.6	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	26
hackberry	Celtis occidentalis	WDH	Medium	33	94.5	6.7	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	27
slippery elm	Ulmus rubra	WSL	Low	23.9	86.6	4.1	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	28
eastern hophornbeam; ironw	Ostrya virginiana	WDL	Low	39.8	82.2	2.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	29
white ash	Fraxinus americana	WDL	Medium	34.1	70.1	3.4	Lg. inc.	Lg. inc.	Low	Common	Good	Good			1	30
black walnut	Juglans nigra	WDH	Low	35.2	69.8	3.2	No change	Sm. inc.	Medium	Common	Fair	Good			1	31
bitternut hickory	Carya cordiformis	WSL	Low	30.7	68.7	3.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	32
scarlet oak	Quercus coccinea	WDL	Medium	34.1	54.6	2.5	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	33
sourwood	Oxydendrum arboreum	NDL	High	17	53.5	3.8	Lg. dec.	Sm. dec.	High	Common	Fair	Fair			1	34
sugarberry	Celtis laevigata	NDH	Medium	18.2	37.4	3.5	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	35
silver maple	Acer saccharinum	NSH	Low	3.4	32.8	9.1	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	36
chinkapin oak	Quercus muehlenbergii	NSL	Medium	37.5	32.1	1.5	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	37
honeylocust	Gleditsia triacanthos	NSH	Low	11.4	30.6	4.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good		Infill ++	1	38
eastern redbud	Cercis canadensis	NSL	Low	26.1	29.6	1.9	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1	39
shingle oak	Quercus imbricaria	NDH	Medium	11.4	28.4	3.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	40
red mulberry	Morus rubra	NSL	Low	20.5	19.2	1.4	Sm. dec.	Sm. inc.	Medium	Rare	Very Poor	Fair			1	41
Virginia pine	Pinus virginiana	NDH	High	3.4	18.0	5.0	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	42
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	22.7	17.7	1.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	43
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	4.5	17.6	3.7	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	44
black locust	Robinia pseudoacacia	NDH	Low	13.6	17.0	4.0	Lg. dec.	Sm. inc.	Medium	Rare	Very Poor	Fair			1	45
shellbark hickory	Carya laciniosa	NSL	Low	9.1	16.0	4.2	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	46
Osage-orange	Maclura pomifera	NDH	Medium	12.5	15.3	4.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	47

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
ailanthus	Ailanthus altissima	NSL	FIA	11.4	9.3	1.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	48
pawpaw	Asimina triloba	NSL	Low	4.5	8.6	1.8	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	49
swamp chestnut oak	Quercus michauxii	NSL	Low	2.3	8.5	3.5	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	50
blackjack oak	Quercus marilandica	NSL	Medium	1.1	7.8	6.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	51
paulownia	Paulownia tomentosa	NSL	FIA	3.4	6.9	1.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	52
serviceberry	Amelanchier spp.	NSL	Low	4.5	6.8	1.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	53
Ohio buckeye	Aesculus glabra	NSL	Low	2.3	4.3	1.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	54
bur oak	Quercus macrocarpa	NDH	Medium	1.1	3.3	2.7	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	55
blue ash	Fraxinus quadrangulata	NSL	Low	10.2	3.0	2.5	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	56
American basswood	Tilia americana	WSL	Medium	1.1	2.9	2.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	57
willow oak	Quercus phellos	NSL	Low	1.1	2.8	2.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	58
overcup oak	Quercus lyrata	NSL	Medium	1.1	2.1	1.8	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	59
yellow buckeye	Aesculus flava	NSL	Low	1.1	1.5	1.2	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	60
river birch	Betula nigra	NSL	Low	1.1	1.0	0.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	61
butternut	Juglans cinerea	NSLX	FIA	4.5	0.9	2.9	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	62
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	63
red spruce	Picea rubens	NDH	High	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	64
shortleaf pine	Pinus echinata	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Likely +	Likely +	3	65
slash pine	Pinus elliotii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	66
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	67
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	68
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	69
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	70
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	71
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			3	72
eastern cottonwood	Populus deltoides	NSH	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	73
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	74
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	75
Shumard oak	Quercus shumardii	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	76
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	77
black willow	Salix nigra	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat	Likely +	Likely +	3	78
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	79